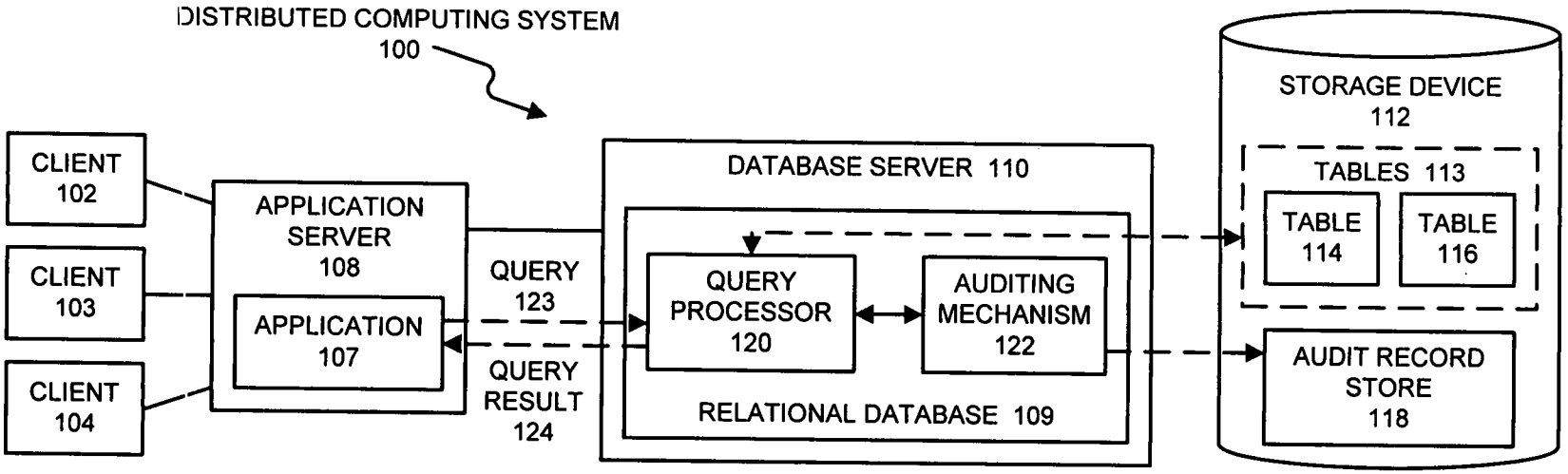
DISTRIBUTED COMPUTING SYSTEM
100
CLIENT
102
CLIENT
103
CLIENT
104
APPLICATION
SERVER
108
APPLICATION
107
QUERY
123
QUERY
RESULT
124
DATABASE SERVER 110
QUERY
PROCESSOR
120
AUDITING
MECHANISM
122
RELATIONAL DATABASE 109
STORAGE DEVICE
112
TABLES 113
TABLE
114
TABLE
116
AUDIT RECORD
STORE
118

FIG. 1

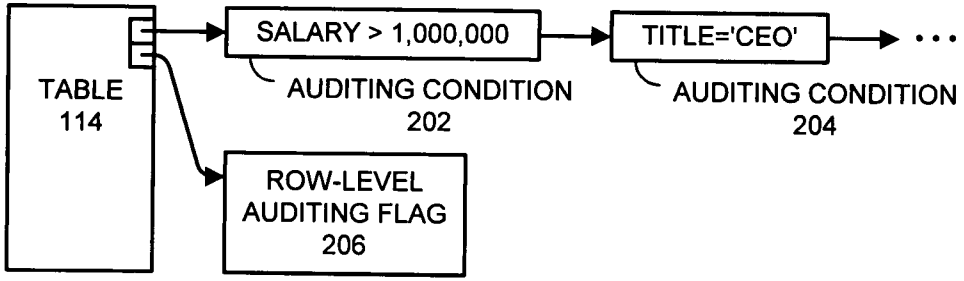
TABLE
114
SALARY > 1,000,000
AUDITING CONDITION
202
TITLE='CEO'
AUDITING CONDITION
204
ROW-LEVEL
AUDITING FLAG
206

FIG. 2

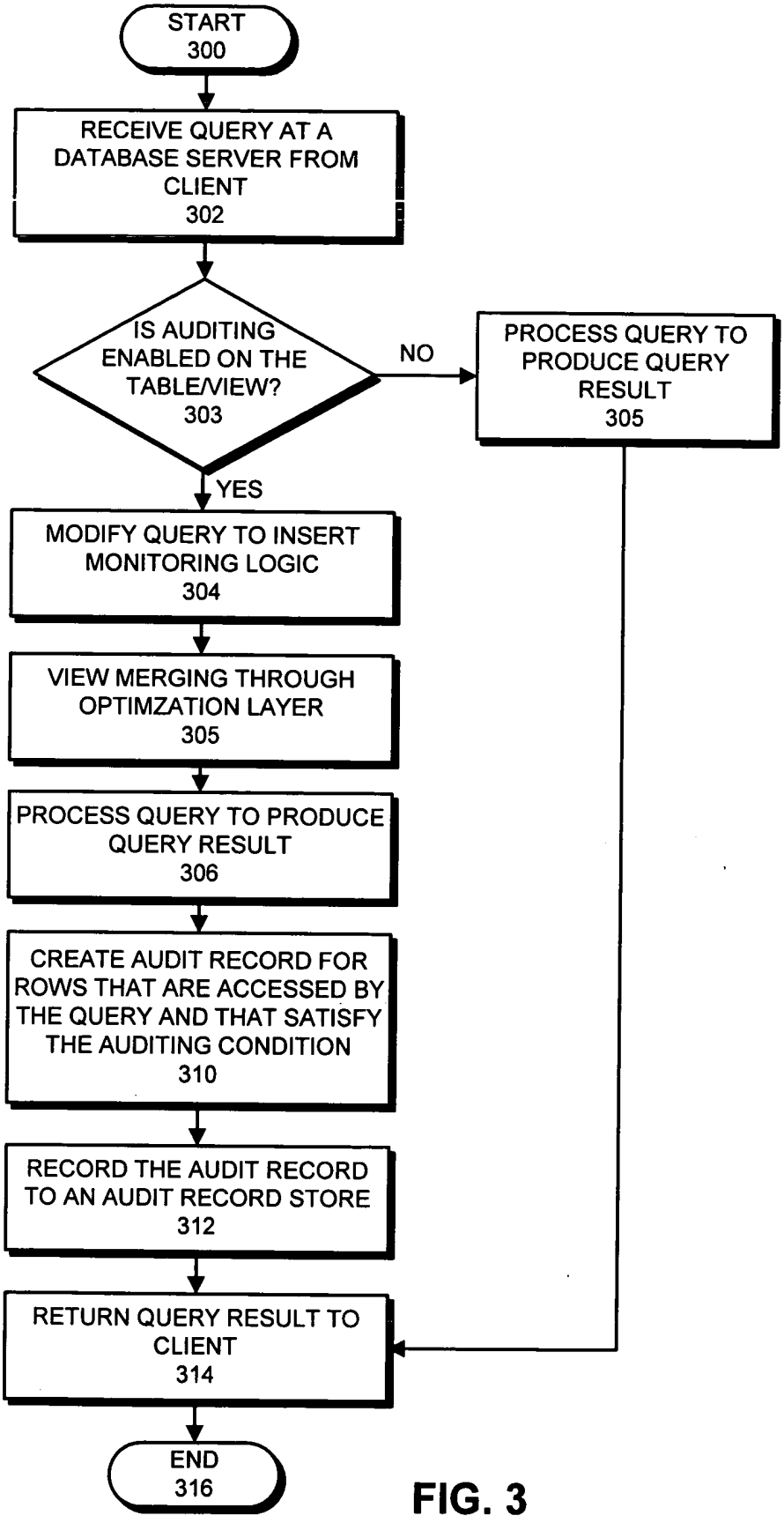
START
300
RECEIVE QUERY AT A DATABASE SERVER FROM CLIENT
302
IS AUDITING ENABLED ON THE TABLE/VIEW?
303
NO
PROCESS QUERY TO PRODUCE QUERY RESULT
305
YES
MODIFY QUERY TO INSERT MONITORING LOGIC
304
VIEW MERGING THROUGH OPTIMZATION LAYER
305
PROCESS QUERY TO PRODUCE QUERY RESULT
306
CREATE AUDIT RECORD FOR ROWS THAT ARE ACCESSED BY THE QUERY AND THAT SATISFY THE AUDITING CONDITION
310
RECORD THE AUDIT RECORD TO AN AUDIT RECORD STORE
312
RETURN QUERY RESULT TO CLIENT
314
END
316

FIG. 3

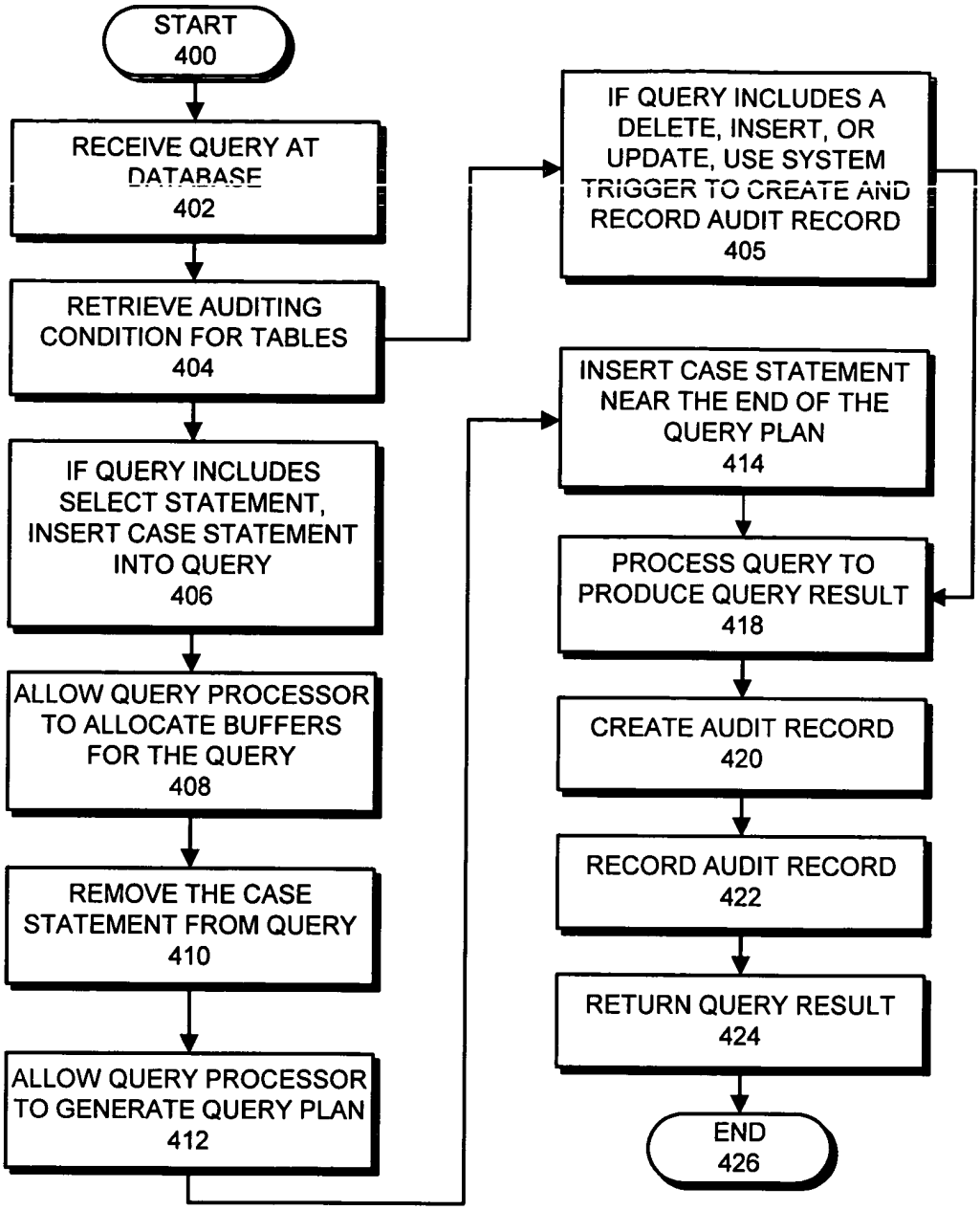
START
400
RECEIVE QUERY AT DATABASE
402
RETRIEVE AUDITING CONDITION FOR TABLES
404
IF QUERY INCLUDES SELECT STATEMENT, INSERT CASE STATEMENT INTO QUERY
406
ALLOW QUERY PROCESSOR TO ALLOCATE BUFFERS FOR THE QUERY
408
REMOVE THE CASE STATEMENT FROM QUERY
410
ALLOW QUERY PROCESSOR TO GENERATE QUERY PLAN
412
IF QUERY INCLUDES A DELETE, INSERT, OR UPDATE, USE SYSTEM TRIGGER TO CREATE AND RECORD AUDIT RECORD
405
INSERT CASE STATEMENT NEAR THE END OF THE QUERY PLAN
414
PROCESS QUERY TO PRODUCE QUERY RESULT
418
CREATE AUDIT RECORD
420
RECORD AUDIT RECORD
422
RETURN QUERY RESULT
424
END
426

FIG. 4